

CLAIMS

What is claimed is:

- 1 1. A method for coordinating execution of compound service over a network, the
2 method comprising the steps of:
3 receiving a request for the compound service that uses output from at least a first
4 service and a second service;
5 reading dependency information associated with the compound service wherein the
6 dependency information specifies a sequence in which a plurality of modules
7 must be executed to perform the compound service;
8 based on the dependency information, coordinating execution of the plurality of
9 modules in the sequence, the modules including at least a first service
10 execution module for coordinating execution of the first service and a second
11 service execution module for coordinating execution of the second service;
12 and
13 generating a result of the compound service based on the output from the first and
14 second services.
- 1 2. The method of claim 1 wherein the dependency information specifies the sequence as
2 a directed graph and the step of coordinating execution of the plurality of modules in
3 the sequence includes coordinating according to information represented by the
4 directed graph.
- 1 3. The method of claim 1 wherein the step of coordinating execution of the first service
2 includes coordinating execution of a second compound service that uses output from
3 at least a third service and a fourth service.

1 4. The method of claim 1 wherein the request for execution of the
2 compound service is received from a source, the method further
3 comprising the step of:
4 transmitting the result of the compound service to the source.

1 5. The method of claim 1 wherein the request for execution of the
2 compound service is received from a source, the method further
3 comprising the step of:
4 transmitting the result of the compound service to a destination different than the
5 source.

1 6. The method of claim 1 wherein the dependency information specifies a sequence in
2 which a transformation module must be executed to perform the compound service
3 and the step of coordinating execution of the plurality of modules in the sequence
4 includes coordinating execution of the transformation module to transform
5 information received by the transformation module from a first data structure to a
6 second data structure.

1 7. The method of claim 1 wherein the dependency information specifies a sequence in
2 which a splitter module must be executed to perform the compound service and the
3 step of coordinating execution of the plurality of modules in the sequence includes
4 coordinating execution of the splitter module to divide a message received by the
5 splitter module into a plurality of messages.

1 8. The method of claim 1 wherein the dependency information specifies a sequence in
2 which a merger module must be executed to perform the compound service and the
3 step of coordinating execution of the plurality of modules in the sequence includes

4 coordinating execution of the merger module to merge a plurality of messages
5 received by the merger module into a single message.

1 9. The method of claim 1 wherein the dependency information specifies a sequence in
2 which a conditional module must be executed to perform the compound service and
3 the step of coordinating execution of the plurality of modules in the sequence includes
4 coordinating execution of the conditional module to determine which module to
5 execute next based on a condition status.

1 10. The method of claim 1 wherein the dependency information specifies a sequence in
2 which one or more of the plurality of modules must be executed concurrently to
3 perform the compound service and the step of coordinating execution of the plurality
4 of modules in the sequence includes coordinating concurrent execution of the one or
5 more modules.

1 11. A computer-readable medium carrying one or more sequences of instructions for
2 coordinating execution of compound service over a network, wherein execution of the
3 one or more sequences of instructions by one or more processors causes the one or
4 more processors to perform the steps of:

5 receiving a request for execution of the compound service that uses output from at
6 least a first service and a second service;
7 reading dependency information associated with the compound service wherein the
8 dependency information specifies a sequence in which a plurality of modules
9 must be executed to perform the compound service;
10 based on the dependency information, coordinating execution of the plurality of
11 modules in the sequence, the modules including at least a first service
12 execution module for coordinating execution of the first service and a second

13 service execution module for coordinating execution of the second service;
14 and
15 generating a result of the compound service based on the output from the first and
16 second services.

1 12. The computer-readable medium of claim 11 wherein the dependency information
2 specifies the sequence as a directed graph and the execution of the one or more
3 sequences of instructions by one or more processors causes the one or more
4 processors to perform the step of coordinating execution of the plurality of modules
5 in the sequence including coordinating according to information represented by the
6 directed graph.

1 13. The computer-readable medium of claim 11 wherein the execution of the one or more
2 sequences of instructions by one or more processors causes the one or more
3 processors to perform the step of coordinating execution of the plurality of modules
4 in the sequence including coordinating execution of a second compound service that
5 uses output from at least a third service and a fourth service.

1 14. The computer-readable medium of claim 11 wherein the request for
2 execution of the compound service is received from a source and the
3 execution of the one or more sequences of instructions by one or more
4 processors causes the one or more processors to perform the step of:
5 transmitting the result of the compound service to the source.

1 15. The computer-readable medium of claim 11 wherein the request for
2 execution of the compound service is received from a source and the
3 execution of the one or more sequences of instructions by one or more
4 processors causes the one or more processors to perform the step of:

transmitting the result of the compound service to a destination different than the source.

16. The computer-readable medium of claim 11 wherein the dependency information specifies a sequence in which a transformation module must be executed to perform the compound service and the execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of coordinating execution of the plurality of modules in the sequence including coordinating execution of the transformation module to transform information received by the transformation module from a first data structure to a second data structure.

17. The computer-readable medium of claim 11 wherein the dependency information specifies a sequence in which a splitter module must be executed to perform the compound service and the execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of coordinating execution of the plurality of modules in the sequence including coordinating execution of the splitter module to divide a message received by the splitter module into a plurality of messages.

18. The computer-readable medium of claim 11 wherein the dependency information specifies a sequence in which a merger module must be executed to perform the compound service and the execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of coordinating execution of the plurality of modules in the sequence including coordinating execution of the merger module to merge a plurality of messages received by the merger module into a single message.

1 19. The computer-readable medium of claim 11 wherein the dependency information
2 specifies a sequence in which a conditional module must be executed to perform the
3 compound service and the execution of the one or more sequences of instructions by
4 one or more processors causes the one or more processors to perform the step of
5 coordinating execution of the plurality of modules in the sequence including
6 coordinating execution of the conditional module to determine which module to
7 execute next based on a condition status.

1 20. The computer-readable medium of claim 11 wherein the dependency information
2 specifies a sequence in which one or more of the plurality of modules must be
3 executed concurrently to perform the compound service and the execution of the one
4 or more sequences of instructions by one or more processors causes the one or more
5 processors to perform the step of coordinating execution of the plurality of modules
6 in the sequence including coordinating concurrent execution of the one or more
7 modules.

1 21. A system comprising:
2 a plurality of invokable modules, wherein at least a subset of the plurality of
3 invokable modules are associated with services; and
4 a compound service execution adapter configured to coordinate execution of the
5 invokable modules according to dependency information that specifies a
6 sequence in which the plurality of invokable modules must be executed to
7 perform a compound service in response to a received request for a compound
8 service.

1 22. The system of claim 21 wherein the dependency information is a directed graph.

1 23. The system of claim 21 wherein the request received by the compound service
2 execution adapter is converted to an Extensible Markup Language (XML) file by the
3 compound service execution adapter.

1 24. The system of claim 21 wherein the plurality of invokable modules includes one or
2 more message transformation modules configured to transform a first arrangement of
3 received message information into a second arrangement of message information.

1 25. The system of claim 24 wherein the received message information is an Extensible
2 Markup Language (XML) message and is transformed by applying an Extensible
3 Stylesheet Language Transformation (XSLT) stylesheet to the XML message.

1 26. The system of claim 21 wherein the plurality of invokable modules includes one or
2 more message splitter modules configured to divide an input message into a plurality
3 of output messages.

1 27. The system of claim 26 wherein the input message is an Extensible Markup Language
2 (XML) message and is divided by applying an Extensible Stylesheet Language
3 Transformation (XSLT) stylesheet to the XML message.

1 28. The system of claim 21 wherein the plurality of invokable modules includes one or
2 more message merger modules configured to merge a plurality of input messages into
3 a single output message.

1 29. The system of claim 28 wherein the input messages are Extensible Markup Language
2 (XML) messages and are merged by applying an Extensible Stylesheet Language
3 Transformation (XSLT) stylesheet to the XML message.

1 30. The system of claim 21 wherein the plurality of invokable modules includes one or
2 more service execution modules configured to interpret one or more received
3 messages as a request for a second compound service constituent to the compound
4 service.

1 31. The system of claim 21 wherein the plurality of invokable modules includes one or
2 more conditional modules configured to direct the compound service execution
3 adapter according to a condition status as to which invokable module to next execute.

1 32. The system of claim 21 wherein the dependency information specifies a sequence in
2 which one or more of the plurality of invokable modules must be executed
3 concurrently to perform the compound service and the compound service execution
4 adapter coordinates concurrent execution of the one or more invokable modules
5 according to the sequence.

1 33. A method for managing execution of a compound service, the method comprising the
2 steps of:
3 defining the compound service by generating a directed graph that indicates a
4 sequence in which a plurality of base services must be executed to perform the
5 compound service, wherein each node of the graph corresponds to a module,
6 and wherein each module includes one or more properties and communicates
7 with one or more other modules via one or more event messages, and wherein
8 the one or more properties contribute to controlling execution of the plurality
9 of base services; and
10 wherein at least one module is from a set consisting of:
11 a service execution module that interprets one or more input messages as a
12 request for the compound service and generates a result output

13 message based on one or more responses from the plurality of base
14 services,
15 a message transformation module that transforms, based on an associated
16 module property, an input data structure of one or more event
17 messages into an output data structure different than the input data
18 structure,
19 a message splitter module that divides, based on an associated module
20 property, an input message into a plurality of output messages, and
21 a message merger module that merges, based on an associated module
22 property, a plurality of input messages into a single output message.

Patent 6,548,440